

REMARKS

In the Office Action, the Examiner rejected the claims under 35 USC §103. The claims have been amended to correct typographical errors and to further clarify the subject matter regarded as the invention. Applicant notes that claims 1, 3-9, 12-23, 25, and 41-43 are withdrawn. Claims 26-37, 39-40, and 44-57 remain pending. The rejections are fully traversed below.

The specification has been amended to remove language pertaining to carrier waves. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of claims 44 and 46-49 under 35 USC 101.

Applicant has addressed the Examiner's rejections under 35 USC 112 below.

Reconsideration of the application is respectfully requested based on the following remarks.

REJECTION OF CLAIMS UNDER 35 USC §112

In the Office Action, the Examiner rejected claims 26, 30, 32, 44, 45, 46, 50, and 54 under 35 USC §112, second paragraph. The Examiner asserts that “[s]ince a physical interface is used to forward the packet from home agent to foreign agent, both Foreign Agent and Home Agent are embodied on two separate routers. If they were on a single router, there would be no point of using a physical interface for transmission.” The Examiner further asserts on page 55 of Applicant’s specification that “neither applicant specification nor drawing even show how home agent and foreign agent are connected by a physical port.” Applicant respectfully traverses these assertions.

It is well-known that a router may include multiple line cards. This is further shown with respect to FIG. 9 of Applicant’s specification, which illustrates interfaces 668, which “are typically provided as interface cards (sometimes referred to as “line cards”).” See page 18, lines 18-19. Page 7 further states that “Home Agent service may be provided on one interface of the router while Foreign Agent service may be provided on another interface of the router 202.” Therefore, a packet could be transmitted between the Home Agent and the Foreign Agent via one of the interfaces 668 on the router.

The Examiner further asserts that “it is unclear whether Foreign Agent and Home Agent are embodied on the same router, or Foreign Agent and home agent are embodied on two different entities/routers.” While FIG. 1 shows the home agent 8 and foreign agent 10 as two separate entities, this diagram is described in the Background section of the application. FIG. 2 shows one embodiment of the invention, in which the router shows both the Home Agent and the Foreign Agent. On page 55 of the Office Action, the Examiner states that the router includes HA **or** FA, not HA **and** FA, as argued by applicant, pointing to the notation “HA/FA” in FIG. 2. The

Examiner further states that “applicant argument that Home Agent and foreign agent functionality within a single router is irrelevant.” Applicant respectfully traverses this assertion.

The Examiner appears to be confused by the notation “HA/FA” in FIG. 2. However, the corresponding description on page 7, lines 11-28 of Applicant’s specification clearly state that “the Mobile IP router 202 includes a Home Agent 204 and a Foreign Agent 206. The Home Agent 204 and the Foreign Agent 206 may be configured to provide service on any number of interfaces...a mobile node 208 may roam from a first interface of the router to a second interface of the router.” Thus, it is clear that a Home Agent and a Foreign Agent are implemented in single router. Thus, Home Agent and foreign agent functionality are provided within a single router, as claimed. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejection of the claims under 35 USC 112.

REJECTION OF CLAIMS UNDER 35 USC §103

In the Office Action, the Examiner rejected claims 26-31 and 44-57 under 35 USC §103 as being unpatentable over La Porta, U.S. Patent No. 6,434,134, (‘La Porta’ hereinafter) in view of Ahmed et al, U.S. Patent No. 6,160,804, (‘Ahmed’ hereinafter). This rejection is fully traversed below.

Various embodiments of the claimed invention support intra-agent mobility. In accordance with one embodiment, this is accomplished by supporting a Home Agent and a Foreign Agent in a single router, enabling the mobile node supported by the Home Agent of the router to roam to the Foreign Agent of the router. In accordance with various embodiments of the invention, this may be enabled by implementing a mobility binding table such, a visitor table, and/or a routing table, which may specify a physical interface on the router rather than the

conventional tunnel interface. Neither of the references, separately or in combination, discloses or suggests the claimed invention.

La Porta discloses a conventional system in which Foreign Agents and Home Agents operate as separate routers. The Examiner admits that “La Porta fails to explicitly teach of disclosing a binding table, which includes an entry associated with at least one mobile node that has registered with a Home Agent of the router and the entry identifies a care-of address associated with the at least one mobile node and a visitor table, which includes the list of addresses of all mobile nodes being serviced by a Foreign Agent of the router and mobile nodes including the at least one mobile node that has registered with the Home Agent of the router, within a router.”

In the most recent Office Action, the Examiner now asserts that La Porta clearly discloses intra-agent mobility where home and foreign functionality are within a single domain router. The Examiner further states that “in response to applicant’s argument, new grounds of rejection is made with the new interpretation of La Porta reference, and thus any rejection or admission made prior to this office is hereby considered moot.”

Despite the Examiner’s recent assertions and numerous citations, Applicant was unable to find any reference in the cited portions in La Porta to a network device including both foreign agent functionality and home agent functionality. For instance, the Examiner refers to the router 150 of FIG. 2 as including foreign agent functionality, as well as home agent functionality. However, Applicant was unable to find any support for these assertions. Rather, cols. 7-8 merely refer to a “home agent 152” that is incorporated at “root router 150.” It is important to note that FIG. 2 shows that the root router 150 includes HA 152, but does not show a FA. As such, La Porta teaches away from the claimed invention. Moreover, nothing in La Porta discloses or suggests that the root router 150 includes both home agent functionality and foreign agent functionality.

With respect to claim 26, the Examiner asserts that La Porta discloses “determining from the registration request packet whether the router includes the Foreign Agent that the mobile node is visiting by ascertaining whether the care-of address specified in the registration request packet is equivalent to an address of the router” and “determining from the registration request packet whether the router includes the Home Agent with which the mobile node is registering.” However, the Examiner refers to FIG. 6, which merely shows a Home Agent, not a Foreign Agent. In no manner does La Porta disclose or suggest a method or apparatus for operating as a network device supporting both home agent and foreign agent functionality, as claimed. As such, Applicant respectfully asserts that La Porta teaches away from the claimed invention.

Claim 26 further recites, “if it is determined from the registration request packet that the router includes the Foreign Agent the mobile node is visiting and the Home Agent with which the mobile node is registering, registering the mobile node visiting the Foreign Agent of the router with the Home Agent of the router.” Again, the Examiner appears to cite various figures such as FIGs. 2, 6, 14, 16a-b, 17, etc. However, none of these figures contemplate that a router may include both a Foreign Agent and a Home Agent, where a mobile node visiting the Foreign Agent of the router registers with the Home Agent of the router. In fact, FIGs. 2 and 6 merely show a router that includes a Home Agent, not a Foreign Agent. As such, La Porta clearly teaches away from the claimed invention.

Claim 26 further recites “forwarding the packet by the Home Agent of the router to the Foreign Agent of the router via a physical interface on the router.” The Examiner appears to assert that La Porta discloses forwarding the packet via a physical interface on the router, citing FIG. 14. However, it is important to note that FIG. 14 shows multiple routers and base stations, and fails to disclose or suggest forwarding a packet from a Home Agent on a router to a Foreign Agent on the same router. Rather, FIG. 14 merely shows the interaction between these different

network devices.

The Examiner admits that La Porta does not explicitly disclose “by ascertaining whether the care-of address...is equivalent to an address of the router.” The Examiner appears to attempt to cure the deficiencies of La Porta with Ahmed.

Ahmed discloses location management techniques that include tracking and/or locating mobile stations within the system. See Abstract. More particularly, Home Location Registers (HLRs) and Visitor Location Registers (VLRs) are used to track the locations of individual mobile hosts. Each mobile station is assigned a Home Location Register (HLR). A HLR maintains the location of a mobile host through the network node it is currently attached to. If a mobile host moves to another network node, it sends a location update message to its HLR. See col. 13, lines 1-51. In addition, each network node also maintains a VLR that records information on mobile hosts that are within its coverage area and have registered with it. See col. 14, lines 48-56.

While Ahmed discloses location management techniques using VLRs and HLRs, Ahmed fails to disclose or suggest intra-agent mobility. More particularly, Ahmed fails to disclose or suggest Home Agent and Foreign Agent functionality within a single router to support intra-agent mobility. Rather, Ahmed implies that a HLR of one network node interacts with a VLR of another, separate network node.

The Examiner notes that “La Porta also teaches in columns 4-6 of route optimization extension that provides a means for the correspondent node to cache a binding associated with the mobile device and then send packets directly to the care-of address indicated in that binding, thereby bypassing the mobile device’s home agent.” Thus, Applicant respectfully asserts that La Porta teaches away from the claimed invention, which requires that packets be intercepted by the home agent, as claimed.

It is important to note that Ahmed fails to disclose or suggest intra-agent mobility where a Home Agent forwards a packet that is not addressed to a particular interface to forward packets to a Foreign Agent via a particular physical interface. In fact, Home Agents normally forward packets to a Foreign Agent by forwarding packets to a care-of address. Thus, the prior art teaches away from a Home Agent of a router forwarding packets to a Foreign Agent of the router by transmitting those packets to a physical interface of the router.

The Examiner cites various portions of Ahmed, including sections corresponding to FIGs. 5A-5B and FIGs. 6A-6B. However, these cited portions neither disclose nor suggest intra-agent mobility in any manner. It is important to note that these portions of Ahmed do not relate to processing a registration request packet to determine whether the router includes the Home Agent with which the mobile node is registering and the Foreign Agent the mobile node is visiting. Rather, these sections merely relate to supporting communication between a mobile node and a correspondent node. For instance, col. 15, line 27 – col. 16, line 17 discloses providing the SNLA of the correspondent node to the initiating mobile, enabling the mobile node to send packets directly to the correspondent node using the SNLA. This is accomplished by looking up a subnetwork layer address. In other words, a physical interface must be identified in the subnetwork layer address of a packet that is transmitted. The subnetwork layer address may be obtained by sending a look up message directly to the HLR of Ahmed, which sends the subnetwork layer address back to the mobile node, as shown at 512 of FIG. 5A. The look up message enables a mobile node to communicate directly with a correspondent mobile node. The look up message is not a registration request message. Since the cited portions of Ahmed neither disclose nor suggest performing Mobile IP registration in the manner claimed, Applicant respectfully asserts that the combination of the cited references would fail to operate as claimed in claim 26.

Neither of the cited references discloses or suggests specifying a physical interface rather

than the conventional tunnel interface in a mobility binding table, a visitor table, or a routing table, where the physical interface is not a part of an address. In fact, because the cited references fail to disclose or suggest intra-agent mobility, there would be no advantage to specifying a physical interface on the router. As such, the cited references, separately or in combination, fail to teach the advantages of specifying a physical interface rather than a tunnel interface.

With respect to claims 38, and 41-43, the Examiner cites La Porta. However, Applicant respectfully submits that La Porta fails to disclose or suggest the specification of a physical interface in the manner claimed, or the advantages thereof. More particularly, La Porta fails to disclose or suggest the specification of a physical interface on a router to support intra-agent mobility within the router.

Similarly, with respect to claims 27, 28, 47, 48, 51, 52, 55, and 56, the Examiner asserts that Ahmed clearly suggests that registration is performed without a tunnel interface. However, Applicant was unable to find a specific portion of Ahmed that indicates that a tunnel interface is not specified.

In the Office Action, the Examiner rejected claims 32, 33, and 35 under 35 USC §103 as being unpatentable over La Porta, U.S. Patent No. 6,434,134, ('La Porta' hereinafter) in view of Yuan, U.S. Pub. No. 2001/0041571, ('Yuan' hereinafter). This rejection is fully traversed below.

As set forth above, La Porta fails to disclose the claimed features as asserted by the Examiner. Yuan fails to cure the deficiencies of La Porta.

The Examiner admits that La Porta does not explicitly disclose "advertising" and "advertised by the router." Even if Yuan discloses foreign agent advertisements, Yuan fails to

cure the deficiencies of La Porta as set forth above. Accordingly, Applicant respectfully asserts that claims 32, 33, and 35 are patentable over the cited references.

In the Office Action, the Examiner rejected claims 34, 36, 37, 39, and 40 under 35 USC §103 as being unpatentable over La Porta, U.S. Patent No. 6,434,134, ('La Porta' hereinafter) in view of Yuan, U.S Pub. No. 2001/0041571, ('Yuan' hereinafter), and further in view of Ahmed. This rejection is fully traversed below.

The Examiner asserts that neither La Porta nor Yuan disclose "without creating a tunnel interface." The Examiner seeks to cure the deficiencies of the primary references with Ahmed.

The Examiner asserts that Ahmed clearly suggests that registration is performed without a tunnel interface. However, Applicant was unable to find a specific portion of Ahmed that indicates that a tunnel interface is not specified. The Examiner appears to assert that "it is clear that updating is performed without a tunnel interface," without providing support for this assertion. Accordingly, Applicant respectfully asserts that claims 34, 36, 37, 39, and 40 are patentable over the cited references.

The dependent claims depend from one of the independent claims and are therefore patentable over the cited art for at least the same reasons. However, the dependent claims recite additional limitations that further distinguish them from the cited references. Hence, it is submitted that the dependent claims are patentable over the cited art. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above discussed limitations are clearly sufficient to distinguish the claimed invention from the cited art.

Thus, it is respectfully requested that the Examiner withdraw the rejection of the claims under 35 USC §103(a).

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for an extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 504480 (Order No. CISCP091C1).

Respectfully submitted,

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